

BEST BRAIN EXAMINATIONS KONSORTIUM
SPECIAL PRIVATE MOCK EXAMINATIONS FOR BECE CANDIDATES – OCTOBER 2021
MARKING SCHEME – INTEGRATED SCIENCE

PAPER 2

PART 1 - TEST OF PRACTICAL WORK

QUESTION ONE

- (a) (i) **OBSERVATION**
 The observer will see the candle light. [2 marks]
- (ii) **NAME AND EXPLANATION OF PHENOMENON:**
 Rectilinear propagation of light/ to show that light travels in a straight line. [1 mark]
- EXPLANATION**
 Light from the candle travels through the holes which are in a straight line to the eye of the observer. [1 mark]
- (iii) **WHEN THE CENTRE CARD IS SHIFTED**
 The observer cannot see the light. [1 mark]
- EXPLANATION**
 There is no space for the light to pass through/light cannot travel through the bent line/light rays will be blocked by card. [1 mark]
- (iv) **A PLANE GLASS WAS PUT BETWEEN LIGHT AND CARD B**
 The light can be seen by the observer [1 mark]
- EXPLANATION**
 Glass is transparent therefore light will still pass through it. [1 mark]
- (v) **ANOTHER CARD WITHOUT HOLE WAS PLACED BETWEEN CARDS AND THE LIGHT.**
 No light can be seen by the observer. [1 mark]
- EXPLANATION**
 The card is opaque therefore blocks the path of light. [1 mark]
- SUB TOTAL = 10 MARKS**
- (b) (i) **IDENTIFICATION OF TOOLS**
 I – hand fork
 II – hoe
 III – shears/ A pair of shears [3 marks @ 1 mark each]
- (ii) **USES OF TOOLS**
Hand fork
 - for digging the soil
 - spreading manure on the surface of the soil
 - stirring vegetable beds
 - stirring compost [1 mark]
- Hoe**
 - for weeding
 - preparing mounds
 - for preparing beds
 - uprooting stumps
 - digging the ground [1 mark]

Shears

- cutting shoots/stems/flowers
- pruning
- trimming

[1 mark]

(iii) WAYS OF MAINTAINING FARM TOOLS

- greasing /oiling
- sharpening/change of blade
- storing in cool dry places/tool boxes
- tightening loose bolts and nuts
- wash and dry clean

[2 marks @ 1 mark each]

(iv) REASONS FOR MAINTAINING FARM TOOLS

- prolong the life span of the tools
- improves the efficiency of a tool
- makes them safe to handle
- saves cost of buying new tools

[2 marks @ 1 mark each]

SUB TOTAL = 10 MARKS**(c) (i) FOUR REASONS PHOTOSYNTHESIS WOULD OCCUR IN THE SET UP**

- 1) Presence of water
- 2) Presence of sunlight
- 3) Availability of air (carbon dioxide)
- 4) Presence of chlorophyll in green leaves.

[2 marks @ ½ mark each]

(ii) ROLE OF SUNLIGHT IN THE PROCESS

Plants use the energy of the sun to change water and carbon dioxide into a sugar called glucose. [2 marks]

(iii) STEPS TO TEST FOR THE MAIN PRODUCT OF PHOTOSYNTHESIS (STARCH/ GLUCOSE)

1. The leaf is placed in boiling water to kill all germs and stop all chemical reactions.
2. It is placed in alcohol and heated to remove the chlorophyll/ decolorize the leaf.
3. It is washed in cold water to soften it.
4. A few drops of iodine solution is added to the leaf. When leaf turns blue-black, it indicates the presence of the main product of photosynthesis (Starch/ glucose) in the leaf.

[4 marks @ 1 mark each]

(iv) BY-PRODUCT OF PHOTOSYNTHESIS AND HOW TO TEST FOR IT.

Oxygen.

[1 mark]

HOW TO TEST FOR OXYGEN

Oxygen supports combustion so a good method of testing for oxygen is to take a glowing splint and place it in a sample of gas, if it re-ignites, the gas is oxygen. [1 mark]

SUB TOTAL = 10 MARKS**(d) (i) NAMING AND EXPLANATION OF EACH OF THE METHODS LABELLED**

A – DISTILLATION – this method of separation involves two processes; **evaporation** and **condensation**. During distillation, the mixture is first heated and the resulting vapour passes through a condenser. The condenser then cools the vapour in order to obtain the pure liquid leaving behind the soluble solute. The purified liquid collected is known as the **distillate**.

B – FILTRATION – this method is used to separate insoluble solids from liquid.

[2 marks @ 1 mark each]

(ii) **IDENTIFICATION OF LABELLED PARTS**

- I – bunsen burner
- II – condenser
- III – beaker
- IV – filter paper
- V – funnel
- VI – volumetric flask

[3 marks @ 1 mark each]

(iii) **USE OF LABELED PARTS**

I (Bunsen burner) - To heat up liquid mixture in volumetric flask during the process of distillation.

II (Condenser): To change vapour into liquid during distillation.

III (Filter paper): it is used to separate fine solid particles from liquids

[3 marks @ 1 mark each]

(iv) **THE ROLE OF HEAT IN ONE OF THE SEPARATION METHODS INVOLVING HEAT.****The role of heat in distillation:**

During distillation, the mixture is first heated and the resulting vapour passes through a condenser. The condenser then cools the vapour in order to obtain the pure liquid leaving behind the soluble solute.

[2 marks @ 1 mark each]
SUB TOTAL = 10 MARKS

TOTAL FOR PART I = 40 MARKS

QUESTION TWO(a) (i) **FUNCTIONS OF PARTS OF HUMAN FEMALE REPRODUCTIVE SYSTEM**

1. **Ovary:** produces eggs (ova)
2. **Uterus:** nurturing and nourishing the developing fetus prior to birth
3. **Vagina**
 - Provides a passageway for blood and mucosal tissue from the uterus during monthly periods.
 - Receives the penis during sexual intercourse and holds the sperm until they pass into the uterus.
 - Passageway for child birth.
4. **Fallopian tube/oviduct:** it receives eggs from the ovaries for fertilization

[3 marks @ 1 mark each]

(ii) **FUNCTIONS OF PARTS OF HUMAN MALE REPRODUCTIVE SYSTEM**

1. **Penis**
 - It is used for penetration during sex.
 - It also contains the urethra which allows for the passage of urine
2. **Testis:** Produces sperms
3. **Scrotum:** The bag of skin that holds and helps to protect the testicles. It also helps to regulate temperature of Testis.
4. **Sperm duct or Vas deferens:** carries sperms from the testes/epididymis to the penis during ejaculation.

[3 marks @ 1 mark each]

(b) (i) **WHY SOLIDS CANNOT BE COMPRESSED EASILY**

The particles in a solid are closely packed together so there is no enough space for further compression.

[1 mark]

(ii) **WHY WE CANNOT FETCH WATER IN A BASKET**

Water is a fluid (it flows) as the particles in water are loosely packed hence can only take the form or shape of a container and thus will flow through holes in basket. [1 mark]

(iii) **GASES CANNOT BE KEPT IN AN OPEN CUP**

The particles in a gas are far apart and move randomly about hence cannot remain in an open cup [1 mark]

(c) (i) **WIND TURBINES**

The wind pushes against turbine blades, causing the motor to spin to create electric currents [2 marks]

(ii) **NUCLEAR POWER PLANTS**

Nuclear reactions are used to generate heat which turns into steam and goes through a turbine. The turbine spins the motor to generate electricity. [2 marks]

(d) (i) **USES OF SOIL TO PLANTS**

- Soil provides a firm support as roots grow through the soil
- Soil provides water for plants
- Plants obtain oxygen from the soil
- Plants obtain nutrients from the soil

[2 marks @ ½ mark each]

(ii) **ORGANIC SOURCES OF CROP NUTRITION**

- Farm yard manure
- Mulch
- Compost
- Green Manure
- Treated human excreta.

[2 marks @ 1 mark each]
SUBTOTAL = 15 MARKS

QUESTION THREE(a) (i) **AN ATOM IS ELECTRICALLY NEUTRAL**

An atom is made up of equal amounts of positively charged protons in the nucleus and negatively charged electrons in the shells. Since the number of protons is equal to number of electrons, the charge cancels out, making the atom electrically neutral. [1 mark]

(ii) **DIFFERENCES BETWEEN PROTONS AND ELECTRONS**

- Protons is positively charged but electron is negatively charged.
- Proton has mass but electron has no (or very negligible) mass.
- Proton is found in the nucleus, but electron is found in shells
- Proton is static, electron spins round
- Proton does not take part in chemical reactions but electrons do.

[2 marks @ 1 mark each]

(iii) **NEON DOES NOT REACT WITH OTHER ELEMENTS**

Neon has electronic configuration 2, 8 hence outermost shell is full and cannot take part in Chemical reactions. [1 mark]

(b) (i) **STAGES IN THE LIFE OF MOSQUITO**

1. Egg stage – the adult mosquito lay eggs into water.
2. Larva stage – the eggs hatch into larva
3. Pupa stage – the larva develops into pupa
4. Adult stage – the pupa develops into adult mosquito.

[2 marks @ ½ mark each]

(ii) **ENVIRONMENTAL METHOD OF CONTROLLING MOSQUITOES**

Destroying breeding grounds of mosquitoes by:

- Draining stagnant waters
- Disposing unwanted containers
- Cutting shrubs and dense vegetation around residential areas.
- Etc.

[2 marks @ 1 mark each]

(c) (i) **DESCRIBING THE PROCESS**

Canning – the process of preserving food in sealed cans or jars.

[1 mark]

(ii) **VEGETABLES THAT ARE PROCESSED USING THE METHOD**

- | | |
|------------|---------------|
| - Corn | - Green beans |
| - Tomatoes | - Peas |
| - Carrots | - Etc. |

[2 marks @ ½ mark each]

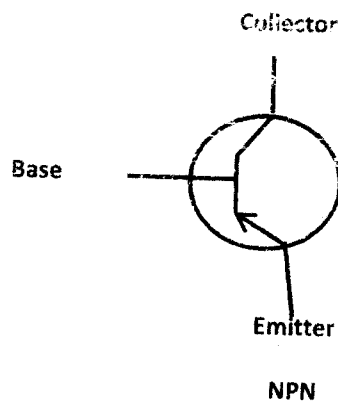
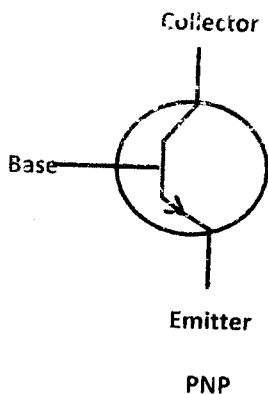
(d) (i) **MEANING OF CAPILLARY ACTION**

It is the tendency of a liquid to rise or fall in a tube due to adhesive and cohesive forces.

[1 mark]

(ii) **EXAMPLES OF CAPILLARY ACTION**

- Drainage of tear fluid from the eyes
- Soaking of water by towels
- Flow of ink in pens
- Drawing of water from the soil by the roots of plants
- Rise of kerosene in the wick of kerosene lamps and stoves
- Burning of candle
- Etc.

[3 marks @ 1 mark each
SUBTOTAL = 15 MARKS]**QUESTION FOUR**(a) (i) **DIAGRAMS SHOWING THE TWO TYPES OF TRANSISTORS**

[3 marks]

(ii) **DIFFERENCE BETWEEN FORWARD BIAS AND REVERSE BIAS FORWARD BIAS**

Forward bias occurs when the p – type side of a p – n junction diode is connected to the positive terminal of a battery and the n – type to the negative terminal of a battery *whiles*

REVERSE BIAS

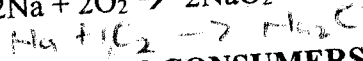
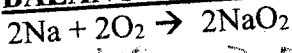
When the negative terminal of the battery is connected to the p – type side of junction and positive terminal to the n – type side of the junction.

[2 marks @ 1 mark each]

(b) (i) WRITE A WORD EQUATION FOR THE CHEMICAL REACTION
Sodium + Oxygen \longrightarrow Sodium oxide

[1 mark]

(ii) BALANCED CHEMICAL REACTION



[1 mark]

(c) (i) TYPES OF CONSUMERS

- Primary consumers – feed directly on producers
- Secondary consumers – feed on primary consumers
- Tertiary consumers – feed on secondary consumers

[3 marks @ 1 mark each]

(ii) ADAPTIVE FEATURES OF TILAPIA

- Scales for protection
- Streamlined body shape to facilitate movement in water
- Fins for movement, steering and balancing
- Gills for respiration
- Lateral line for detecting vibrations

[3 marks @ 1 mark each]

(d) (i) DESCRIPTION OF CULTURAL PRACTICES

Weeding – the act of removing unwanted plants from a vegetable farm

[1 mark]

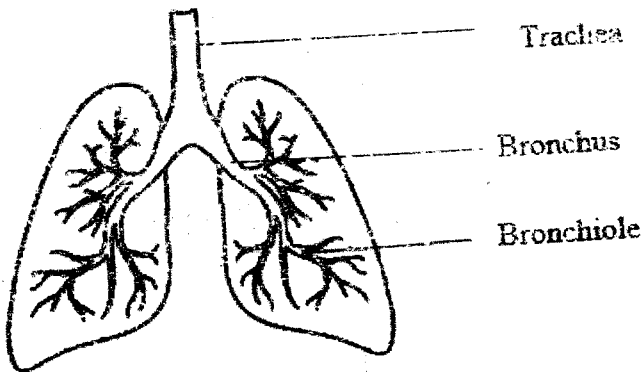
(ii) Mulching – the spreading of decaying leaves on top of the soil around plants

[1 mark]

SUBTOTAL = 15 MARKS

QUESTION FIVE

(a) DIAGRAM OF THE LEFT AND RIGHT LUNG SHOWING THE TRACHEA, BRONCHUS AND THE BRONCHIOLES



[4 marks]

(b) (i) APPLICATION OF PRESSURE

- Used to suck soft drinks with straw
- The brakes of a car use fluid pressure to cause the car to stop.
- Syringes for injections use pressure
- Pumps mounted on dug – out well pump out water by atmospheric pressure.
- Pipette used in the laboratory makes use of pressure
- Siphon used to draw petrol out of petrol tank of cars.

[2 marks @ 1 mark each]

(ii) WHY IT IS IMPORTANT TO SHARPEN A KNIFE BEFORE USE

When a knife is sharpened, the cutting edge becomes smaller so that with a little force applied, a large pressure is extended for cutting to be easier.

[1 mark]

- (c) (i) **PROPERTIES OF ACIDS**
- Sour taste
 - Corrosive effects
 - Change blue litmus paper red
 - PH is less than 7
 - React with bases to form salt and water
 - React with carbonate to form salt water and CO_2
 - React with reactive metals to produce hydrogen gas.
 - Strong acids conduct electricity in solution
- [2 marks @ ½ mark each]
- (ii) **PROPERTIES OF BASES**
- Bitter taste
 - Change red litmus paper to blue
 - Corrosive when concentrated
 - PH is greater than 7
 - Feel slippery or soapy
 - React with acids to produce salt and water.
- [2 marks @ ½ mark each]
- (d) (i) **WAYS BY WHICH SEEDS CAN BE SOWN**
- Broadcasting:** Sowing seeds by evenly spreading on top of the soil and covering gently with a layer of soil. [1 mark]
- Drilling:** Sowing seeds into small trenches and covering gently with soil. [1 mark]
- (ii) **BENEFITS OF RAISED BEDS IN VEGETABLE CROP PRODUCTION**
- Check soil erosion
 - Helps easy penetration of water into soil
 - Helps easy penetration of air into soil
 - Prevents vegetables from flooding
 - Prevents broadcasted seeds from being washed away.
- [2 marks @ 1 mark each]
SUBTOTAL = 15 MARKS

QUESTION SIX

- (a) (i) **DIFFERENCE BETWEEN TOOTH PLAQUE AND TOOTH DECAY**
- TOOTH PLAQUE**
- Plaque is gradually formed on the teeth when food particles are not properly removed from teeth. As more food particles accumulate in the teeth and in the corners of the teeth a hard layer dirt forms on the teeth. [1 mark]
- TOOTH DECAY**
- Tooth decay is caused by certain types of acid – producing bacteria. These acids eat away dissolve the enamel of the teeth and finally damage the underneath teeth structure. [1 mark]
- (ii) **WAYS OF PREVENTING DENTAL DISORDERS.**
- Regular visit to the dentist
 - Regular brushing of teeth
 - Avoid excessive intake of sugary foods
 - Eating food rich in vegetables
 - Eating a lot of fruits
 - Eating foods rich in calcium
 - Using the teeth for the right purpose
 - Avoid eating too hot or too cold foods
 - Etc.
- [2 marks @ ½ mark each]

(b) (i) CONDITIONS UNDER WHICH AN OBJECT FLOATS ON WATER

When the density of the object is less than that of water

Or: When the body is less dense than water

Or: When the mass to volume ratio of the object is smaller than equal volume of water.

(ii) FEATURES OF A WOODEN BOAT

- Streamlined shape of the boat reduces frictions of movement
- Planks of wood put across the boat from side-to-side resist to force of the water.
- Hoisting of sails to the mast harnesses the energy of the wind.
- The boat is made water tight so water cannot enter.
- Hollow shape of the boat helps to float on water.
- The curved shapes of the sides make boats stable on water. [2 marks @ 1 mark each]

(c) (i) PREPARATION OF SATURATED SUGAR SOLUTION

- Measure a quantity of liquid / water
- Add small quantity of solute (sugar)
- Stir till sugar dissolves
- Repeat adding and stirring till no more sugar can dissolve

[2 marks @ ½ mark each]

(ii) SEPARATION OF SUGAR SOLUTION

Put mixture in test tube and heat. Water evaporates leaving sugar in tube.

[2 marks]

(d) (i) SYMPTOMS OF SWOLLEN SHOOT DISEASE IN COCOA PLANT

- Red vein banding in young leaves
- Swelling of the stem
- Yellow banding along the main veins of leaves
- Vein clearing in leaves
- Chlorosis and mottling of mature leaves
- Abnormally shaped pods, usually smaller and spherical.

[1 mark @ ½ mark each]

(ii) WAYS TO CONTROL THE SWOLLEN SHOOT DISEASE IN COCOA PLANT

- Use of barrier crops
- Eradicating or cutting out of infected plants
- Development of tolerant varieties of cocoa.

[2 marks @ 1 mark each]

SUBTOTAL = 15 MARKS

TOTAL FOR PART II = 60 MARKS

THUS TOTAL FOR PAPER 2 = (PART I + PART II) = 100 MARKS

PAPER I [40 MARKS]

| | | | |
|-------|-------|-------|-------|
| 1. B | 11. D | 21. B | 31. D |
| 2. C | 12. A | 22. D | 32. B |
| 3. D | 13. A | 23. A | 33. B |
| 4. B | 14. D | 24. B | 34. B |
| 5. D | 15. A | 25. B | 35. D |
| 6. B | 16. C | 26. B | 36. D |
| 7. A | 17. D | 27. B | 37. A |
| 8. D | 18. A | 28. C | 38. B |
| 9. A | 19. C | 29. B | 39. D |
| 10. A | 20. C | 30. B | 40. A |

GRAND TOTAL = PAPER 1 (40) + PAPER 2 (100) = 140 MARKS

OVERALL SCORE = TOTAL SCORE X 100

140